EPA-CPG Modeling Oversight Meeting – 3/13/14

Model Input Changes

PWCM inputs – nothing substantial

Bathymetry:

- At RM7.3, model always predicts deposition, even when bathy data does not. Found that model cross section does not match river cross section
    - Garland explains that this is because trying to get model to simulate nav channel cutting across river.
    - CPG adjusted model cross section.
    - Get artifacts of grid resolution
    - Achieved less deposition.

Bed Density Profile

- Had unrealistic density at depth
- Change in linkage from ST to F&T model – now pass bed thickness & ??
- So need better estimate of bed density
- Used data from predominantly cohesive cores of LPR cores to get dry density for depositing layers (not fluff layer)
- At depth, relied mostly on LRC cores.

Defined sediments from ocean boundary as silts, from Dundee Dam as clays – EPA commented negatively, so CPG made change

- Data show no trend with discharge, see consistently 80% silt, 20% clays (from Dundee Dam or ocean end)
- Now, from ocean end, have flocculated silts & clays with higher settling velocities; from Dam, have unflocculated silts & clays, clays have low settling vel and silts have middle settling vel's. After pass through fluff layer, get aggregated in some way.
- So now have 4 non-cohesive classes, which increased run times by 50%.
- So for most of the time, doing advection calcualtions on 2 largest non-classes is not necessary, so eliminated that in some way.

Dundee Dam Solids

- Compared Little Falls rating curve used to develop solids inputs at Dam to PWCM/CWCM/PVSC/MPI data at Dam. Curve generally overpredicts data by 2-3.
- Found that Little Falls USGS data from 1960s (when daily data were avail) were generally higher than PVSC more recent data at Little Falls
- So CPG developed new rating curve to be 2-3x lower.
- Note scarecity of data at high flows, so uncertainty
- Bringing in less solids at Dam.
- Generally use Dam data when available, then use new rating curve when no data.

Fluff Layer Erosion properties

- Lowered critical shear stress for erosion (to match data)
- Compared fluff layer erosion to Gust microcosm data

Parent Layer Erosion properties

- First derived from Sedflume data
- Calibration led CPG to use 6x critical shear stress
- But 6x critical shear stress over-predicts data?

Found evidence of ship navigation scour

- Trying to incorporate propeller scour velocities into model.
- Did comparison of solids loads caused by nav scour (?) vs. load from Dundee Dam – significant.
- CPG trying to come up with an "equilibrium depth" beyond which ship traffic will not have any resuspension effect.
- Advice from Garland: instead of trying just to solve this specific area of LPR, might want to come up with a more general solution that will apply to NB too, where ship scour would be more important of an effect.
- Work in progress.